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REPORT
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LAND REMOTE-SENSING COMMERCIALIZATION ACT OF 1984

APRIL 3, 1984.—Committed to the Committee of the Whole House on the State of the Union and ordered to be printed

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Mr. FUQUA, from the Committee on Science and Technology, submitted the following

REPORT

together with

ADDITIONAL VIEWS

[To accompany H.R. 5155]

[Including cost estimate of the Congressional Budget Office]

The Committee on Science and Technology, to which was referred the bill (H.R. 5155) to establish a system to promote the use of land remote-sensing satellite data, and for other purposes, having considered the same, report favorably thereon without amendment and recommend that the bill do pass.

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I. PURPOSE OF THE BILL

The purposes of the bill are (1) to provide for the phased commercialization of land remote sensing, (2) to ensure the continuity and availability of land remote-sensing data, (3) to establish a clear framework of national security and international policy requirements within which private remote-sensing space systems operate, (4) to promote a unified research and development program which would maintain the United States' leadership in remote sensing, (5) to provide for the archiving of a basic set of land remote-sensing data that will serve the public interest for global environmental monitoring, (6) to delineate the authorities and responsibilities of the Federal Government in overseeing private sector remote sensing systems. (7) to designate the Department of Commerce as the lead agency for transferring space remote sensing to the private sector, for promulgating and enforcing needed regulations, and for licensing of private sector operators, and (8) to prohibit the commercialization of meteorological satellites.

II. NEED FOR LEGISLATION

Legislation was first introduced in Congress to establish an operational Landsat system in 1973, one year after the launch of Landsat 1. Between 1973 and 1983, over twenty bills were introduced dealing with the operational Landsat question, with Landsat commercialization, or with other remote-sensing issues, although none was reported out of Committee. Historically, land remote sensing has enjoyed strong support in the Congress, but there has been a lack of consensus on the appropriate institutional arrangement for an operational system, on the role of the Federal Government, and

on the best means of encouraging the increased participation of the private sector.

Under the provisions of P.L. 98-52, the Secretary of Commerce does not have the authority to commercialize the Landsat system without prior statutory approval. This language was adopted to ensure Congressional involvement in deciding the many policy issues that commercialization would raise and with knowledge that, pursuant to a Presidential decision, the Administration was proceeding to develop its own independent request for proposals (REP) for commercialization of land remote-sensing systems.

Issues that are raised by the possibility of commercialization include: program continuity; foreign competition, national security; international obligations and policy; research and development; remote sensing as a "public good"; the government's role in assisting commercialization; and government oversight mechanisms. These are all discussed more fully in Section V of this report.

Why Commercialize? The Committee and the Congress have over the years supported commercialization of space technology whenever such commercialization is appropriate. For example, the 98th Congress has augmented programs such as NASA's Technology Utilization Program which make space technology generally available to users. In the case of land remoted sensing, the Committee has indicated its specific support for commercialization in Report 98-65 accompanying H.R. 2065, the NASA Fiscal Year 1984 authorization bill (which became P.L. 98-52).

From its inception, the Landsat technology was intended to be commercialized because the majority of its uses serve commercial interests. A present inhibition to commercialization is the lack of a market, and market development is an activity in which the private sector excels. Entrepreneurs will make sure that potential users become paying users, so there will be a greater use of these data. The private sector is also good at optimizing the cost-effectiveness of technology—and making the benefits broadly available—as it has done with the computer chip. Ultimately, commercialization should reduce Federal expenditures by perhaps $150 million per year (but in the near term, costs may be about the same). In summary, a market-driven system will result in more efficient technology and hardware, expanded markets, and a broader scope of benefits for all.

Summary.—Given the general support for commercialization of space technology, the several issues that arise when land remote-sensing commercialization is considered, and the statutory prohibition of commercialization, there is a clear need for legislation both to resolve the issues and to allow potential benefits, both public and private, to be realized.

III. TITLE-BY-TITLE SUMMARY OF THE BILL

Three progressive phases of commercialization of land remote sensing are established in Titles II, III, and IV of H.R. 5155. The other titles provide a context for the commercialization process.

Title I has findings, purposes, policies, and definitions.

Title II provides for the first phase of commercialization. A contractor would market all new and archived data from the existing

Landsat system and might also contract for operating the system. This phased approach will provide commercial marketing experience and preserve data continuity while the private sector builds the follow-on land remote-sensing space system provided for by Title III.

Title III provides a six-year transition period as the next phase of commercialization, with the six-year period defined in terms of assurance of data continuity. To assure such continuity, the Secretary of Commerce may pay a private sector operator some capital costs to provide the necessary system capability. This capital payment is, in effect, a subsidy to help the private-sector party build and launch the system; however, the subsidy would be minimized through use of a competitive selection process. The subsidy will be partially offset by a rebate on data sales to the Federal Government. No Federal data purchases could be guaranteed. No technology is specified, although a minimum quantity and quality of data are.

Title IV provides a procedure for licensing any private system including that established under Title III. The constraints placed on license holders are few, but include non-discriminatory data access and foreign policy and national security considerations. Administrative procedures and regulatory and enforcement authority are established for the Secretary of Commerce.

Title V authorizes and encourages continued Federal R&D in civil space remote sensing. Research mandates for NOAA and NASA are clearly expressed. Data gathered in experimental programs may be marketed through the private sector on a competitive basis.

Title VI contains general provisions including provisions for archiving data.

Title VII prohibits Metsat commercialization.

IV. COMMITTEE ACTIONS

On March 27, 1984, the Committee on Science and Technology, a quorum being present, ordered H.R. 5155 reported by voice vote.

This action was the culmination of a series of Committee activities. Because they share jurisdiction on this matter, the Subcommittee on Natural Resources, Agriculture Research and Environment and the Subcommittee on Space Science and Applications have worked together in this Congress to develop the legislation.

The Committee has held many hearings on the general subject of land remote sensing over the past several Congresses. In 1983, hearings became more focused as a result of specific Administration actions (e.g., solicitation of bids) pursuant to a decision to commercialize land and weather satellites made by the President on March 8, 1983. Consequently, the two Subcommittees held joint hearings on April 14, June 21 and 28, July 14 and 21, and November 8 and 9.[1] The November hearings were held to take testimony on draft legislation which the Subcommittees had circulated prior to the hearings.

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[1] The Commercialization of Meteorological and Land Remote-Sensing Satellites. Hearings, Committee on Science and Technology, U.S. House of Representatives, 98th Congress, 1983. No. 53.

Comments received on this draft legislation were incorporated into a bill, H.R. 4836, which was introduced by Chairman Fuqua and sixteen cosponsors on February 8, 1984. In hearings on this bill held March 6, 1984, the Administration witness supported the bill in general but suggested several perfecting amendments. The two Subcommittees subsequently marked up H.R. 4836 and adopted a series of clarifying, perfecting, and technical amendments. The subcommittee on Space Science and Applications marked up H.R. 4836 on March 13; the Subcommittee on Natural Resources, Agriculture Research and Environment on March 15, 1984. After the second markup, a clean bill, H.R. 5155, was introduced incorporating the amendments adopted by both Subcommittees. H.R. 5155 was the bill acted on by the Full Committee and reported on herein.

V. BACKGROUND AND COMMERCIALIZATION ISSUES

Background [2]

Landsat is the name applied to a series of NASA-developed remote-sensing satellites that orbit at an altitude of 570 miles and gather data in both the visible and infrared spectrum pertaining to features of the Earth.[3] Landsat or similar data can be processed into images and digital information of value in a growing variety of applications, including predictions of agricultural yield and crop health; agricultural classification; land-use mapping; forest management; hydrology; mineral and oil exploration; cartography; and environmental monitoring.

The first Landsat was launched by NASA in 1972; Landsat 5, the current operational satellite and the final satellite planned in the series, was launched on March 1, 1984. Landsat 5 carries two sensors. The multispectral scanner (MSS), which was carried on all four previous Landsats, has a resolution of 80 meters and returns data in four spectral wavelengths. The other sensor on Landsat 5 is the thematic mapper (TM), which functioned for a short while in 1982 aboard Landsat 4 and is still essentially an experimental sensor. The TM is a more advanced sensor than MSS, with a 30-meter resolution and seven spectral wavelengths.

From 1972 to 1979, NASA's experimental Landsat program generated great quantities of data regarding the Earth's surface, resulting in a growing realization that this kind of technology might ultimately prove to be commercially exploitable. However, there was no comprehensive, long-range plan leading either to establishment of a government-owned operational system or to a phased transition to a commercial, privately owned and operated system.

In 1979, responsibility for the operation of Landsat was transferred to the National Oceanic and Atmospheric Administration (NOAA) in the Department of Commerce. At the same time, NOAA was directed to study whether the private sector could operate a land remote-sensing system in the future. At that time, it was

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[2] Background information on the United States civilian remote-sensing program may be found in "Commercialization of Land and Weather Satellites," a report prepared by the Congressional Research Service (Serial H of the Committee on Science and Technology, U.S. House of Representatives, 98th Congress, 1st Session).

[3] H.R. 5155 deals in Title II with the Landsat satellites but is primarily focused on the follow-on commercial systems which will be built and operated by the private sector.

thought that a Government commitment to data continuity through 1994 was needed to encourage private-sector investment in data processing and training necessary to nurture and expand the data market. It was assumed that by 1994 Landsat data sales would be large enough to meet satellite procurement and operations costs and that the private sector would then be able to operate the system for profit.

In the revised Fiscal Year 1982 budget request (submitted to Congress in March, 1981), plans to build Landsat 6 and 7 were dropped in expectation that the private sector would be able to launch land remote-sensing satellites by the late 1980s. In July 1981, the Cabinet Council on Commerce and Trade (CCCT), chaired by the Secretary of Commerce, was assigned the responsibility for assessing: (i) the best mechanism for transferring Landsat to the private sector as soon as possible, and (ii) whether the government's four operational civil weather satellites should be transferred at the same time. The CCCT met periodically through late 1982, and in March, 1983, President Reagan announced his decision to transfer the civil land remote-sensing system, the civil weather satellite system, and future ocean-observing systems to the private sector as soon as possible.

In the fall of 1983, both the House and the Senate passed concurrent resolutions expressing the sense of the Congress that weather satellites should not be transferred to the private sector. The Administration's proposal to transfer weather satellites was finally dropped in November, 1983, after the passage of P.L. 98-166, the Fiscal Year 1984 Appropriations Act for the Department of Commerce, which contained language prohibiting the use of funds for the transfer.

The question of commercialization of land remote sensing remained, however, and the need for a rapid policy resolution was highlighted by the gradual and premature failure of Landsat 4 during 1983, and the early launch of Landsat 5 in 1984, events which dictated that a follow-on system of some kind would be needed sooner than expected.

Issues Arising in Considering Commercialization

Although no definitive plan for commercialization has ever been developed, there has long been a consensus in the United States government that land remote sensing could ultimately evolve into a profitable private-sector enterprise. There has been a further relaization that development of a private land remote-sensing system could occur if policy decisions were reached on a number of key issues. The following sections discuss the issues needing to be resolved as commercialization proceeds.

PROGRAM CONTINUITY

At present, Landsat has no strong user market and data sales are not large enough to meet procurement and operations costs. Users have been discouraged from making investments in equipment and training and from beginning long-range applications research because of the uncertainty of continuous data availability. Further, because the Landsat system has been an experimental

program, no valid market assessment or development efforts have been undertaken, with the result that the true dimensions and characteristics of the market are unknown. A long-term commitment to a user-oriented land remote-sensing program is needed for a market to develop, according to many proponents.

FOREIGN COMPETITION

The French are planning to launch SPOT, a remote-sensing satellite, in 1985. Japan is developing a remote-sensing satellite for oil and mineral exploration, and the European Space Agency plans to launch an ocean resources satellite in the 1980s. Without a strong commitment to a future land remote-sensing program, the United States could lose some of its foreign and domestic market for Landsat data to the French, who are marketing SPOT vigorously and who have strong government support behind the SPOT system.

NATIONAL SECURITY

Remote sensing involves inherent national security considerations. If the detail or resolution of the imagery obtained is fine enough, strategically important manmade features may be discerned. It is clearly inappropriate for the United States government to permit its citizens to engage in activities that amount to intelligence gathering as a commercial enterprise.

National security concerns associated with commercialization can be met with appropriate oversight and control by selected civil and defense agencies of the United States government. A discussion of these oversight mechanisms may be found in the February 1, 1984 report of the General Accounting Office entitled, "National Security Implications of Commercializing Landsat and Weather Satellites" and the March, 1984 report of the Office of Technology Assessment entitled, "Remote-Sensing and the Private Sector: Issues for Discussion".

INTERNATIONAL OBLIGATIONS AND POLICIES

Some nations have advocated a policy of "prior consent" with respect to remote sensing—that is they do not want to be observed from space without their prior consent. The United States, however, has long maintained an "open skies" policy, i.e., the right to observe any country from space, and in addition has made its romote-sensing data available to all without prejudice or favored access. This latter policy of "non-discriminatory data access" has proven to be a great value in keeping United States civil romote sensing fee from charges of military surveillance or economic exploitation.

The United States has supplied Landsat data an related services to many developed and developing countries. There are currently several operating foreign ground stations capable of receiving Landsat data directly from the satellite, and several others under development.

In addition to its adherence to the "open skies" policy and the policy of non-discriminatory data access, the United States has participated in the development of four major international agreements and treaties that would affect the operation of a privately

owned remote-sensing system. Perhaps of greatest relevance, Article VI of the 1967 Outer Space Treaty requires "continuing supervision by the appropriate State party to the Treaty". This has been interpreted as requiring some form of licensing and regulatory oversight by the Federal government for any United States private remote-sensing venture.

A discussion of these foreign policy considerations may be found in the February 24, 1984 report of the General Accounting Office entitled, "Effects on Users of Commercializing Landsat and the Weather Satellites" and the March, 1984 report of the Office of Technology Assessment entitled, "Remote-Sensing and the Private Sector: Issues for Discussion."

RESEARCH AND DEVELOPMENT

Landsat was developed as a research satellite by the National Aeronautics and Space Administration. The transfer of land remote sensing to the private sector would still leave the question of who has responsibility for continuing high-risk research and development in remote sensing to ensure that the United States remote-sensing space effort remains competitive in the world market.

REMOTE SENSING AS A "PUBLIC GOOD"

The Congress ultimately rejected the Administration's proposal to commercialize weather satellites in part because they support a public function in the United States as well as in over 100 countries around the world. Landsat data might also be considered a public good since they are used for a variety of public services by all levels of domestic government and by over forty nations worldwide. Even if the Landsat system were commercialized, provisions could be adopted which would protect some of the "public good" aspects of land remote sensing, such as non-discriminatory data access, applications research, foreign aid, and long-term environmental monitoring by means of a government data archive.

THE GOVERNMENT'S ROLE IN SUPPORTING COMMERCIALIZATION

Given that the presently undeveloped market for land remote-sensing data is probably not large enough to support a commercial venture, there are a number of policies which the government could adopt to help a private-sector operator during the transition period preceding full commercialization. Some of these policies might include: subsidies; loan guarantees; guaranteed data purchase contracts; launch services; research and development; and radio frequency allocation.

GOVERNMENT OVERSIGHT

Operation of remote-sensing systems from space by commercial entrepreneurs would necessitate a mix of mechanisms for Federal oversight and regulation. For example, a specific Federal agency might be legislatively designated as lead agency in development of regulations which would protect United States national security and international obligations. In addition, the remote-sensing

value-added industry has argued that protections would be needed to ensure that a private operator would not enjoy an unfair competitive posture vis-a-vis the value-added industry as a result of favored access to data. Any regulatory process should be carefully structured to yield the needed oversight without inhibiting this new industry.

VI. EXPLANATION OF THE BILL

Guiding Principles

H.R. 5155 as drafted and reported reflects the following guiding principles:

1. The framework supporting the transition from a Federally operated remote-sensing system to a commercial system should permit the private sector to make the critical decisions to the maximum extent possible. For example, the level of technology should not be dictated by legislation; rather, a minimum standard should be set that protects existing users and yet allows the remote-sensing data market to drive the level of technology without stifling innovation.

2. The provision of data continuity is essential to a commercially viable system. Lack of a clear commitment to data continuity has to date adversely affected the establishment of a land remote-sensing data market. Data continuity is significant both in the sense of a steady supply of data and also in the sense of data compatible with hardware, software, and training in which users have already invested.

3. A truly commercial system will be driven by user needs. Technology, data quality, data format, data dissemination and other system design features will evolve to be reponsive to market forces.

4. It is likely that some initial subsidy from the Government may be needed in order to assure that the capability to collect and deliver data is established in the private sector. However, competition should be fostered to minimize the amount of this subsidy.

5. Phased commercialization starting with the ground segment—i.e., marketing—is the most promising approach to ensure that the private sector's role evolves in an orderly manner. Thus, it is crucial that marketing of data from the existing Landsat system be transferred to the private sector at once, but not as important that operation of the existing system be immediately transferred to the private sector.

6. Both non-discriminatory data access and considerate treatment of foreign ground stations are important United States foreign policy concerns. Non-discriminatory data access is an important foreign policy tool that should be maintained.

The "value-added" business is healthy, commercial, and entrepreneurial, and the principal stimulus for potential market demand. Anti-competitive practices which would affect this industry should be prohibited.

8. Weather satellites perform an inherently governmental function and should not be commercialized.

9. The Federal Government should continue research in satellite remote sensing.

Issues Addressed by the Legislation

This section of the Report addresses a variety of issues raised by the legislation and explains the Committee's intent in adopting the specific provisions of the bill that deal with these issues. The section is organized into two parts: topics in the first group are major policy issues and are addressed in the order that they arise in the legislation. Some of these issues, such as "Non-Discriminatory Data Access" permeate the bill. Topics in the second group are more technical or narow in nature and are addressed under the heading "Other Issues".

NON-DISCRIMINATORY DATA ACCESS

The bill in Section 601 (and other Sections) provides that data "shall be made available to users on a non-discriminatory basis . . ." The term "on a non-discriminatory basis" is defined in section 104(3). The following paragraphs enlarge on the Committee's intent and the reasoning behind that intent.

First, what does "on a non-discriminatory basis" mean with respect to data sales? Very simply, it means that a system operator must make data available to everyone on the same public terms. He cannot choose his customers or favor one over another.

Before expanding on this definition, it is appropriate to address why the Committee has written this non-discriminatory policy into the legislation. Several reasons are listed and discussed below.

It maintains many of the "public good" aspects of remote sensing.—Many have argued that a space remote sensing should not be commercialized because it represents a public good. Indeed, this was part of the reason that commercialization of weather satellites was prohibited. Having the system operator make data available on a non-discriminatory basis will strike a balance here. In other words, a system operator would act in a manner somewhat analogous to a common carrier in transportation. This also conforms remote sensing to the basic policy in the National Aeronautics and Space Act of 1958 which says that activities in space should be devoted to peaceful purposes for the benefit of all mankind.

It promotes the broadest use of the data.—Many have been concerned that the system operator would be able to auction the data to the highest bidder, which of course would amount to very discriminatory selling. If the operator is not allowed to do so, he would be encouraged both to sell very broadly and to structure his marketing efforts to reach as many customers as possible. That is to say, in order to maximize his profits, he would have to generate new markets, new applications, and new customers.

It puts the United States in a favorable position vis-a-vis the many countries who argue that no remote sensing should take place without the "prior consent" of the sensed country.—At the Unispace 82 Conference in Vienna, the United States was one of a very small number of countries who wished to maintain the "open skies" policy which would allow a satellite to sense any nation. A corollary of the open skies policy which has been followed by the United States is that the data taken by such a satellite would be made available to everyone on a non-discriminatory basis. Of course, the many countries arguing in favor of prior consent do not have space

programs and cannot prevent the United States from taking data from space; but they do have considerable power in some fora of the United Nations and other international organizations which are run on a one-country-one-vote basis. It seems clear that the United States should not agree to a prior consent regime and therefore, it would seem prudent to maintain the non-discriminatory access aspect of the open skies policy as a blancing consideration. Indeed, the United States made a particular point at the Unispace conference of the broad availability of Landsat data—the fact that these data are "accessible to every country". Briefing papers prepared for the United States delegation stated, "the United States requires that all Landsat data at the United States EROS data center and at foreign ground stations be available on a public non-discriminatory basis. Open availability of such data has led to beneficial applications of land remote-sensing worldwide . . ." This same point was echoed in the 1982 report entitled, Science, Technology and American Diplomacy, the third annual report submitted to the Congress by the President pursuant to Section 503(b) of Title V of Public Law 95-426. On Page 26, the following appears: "In remote sensing, the readily available products of United States meteorological and land satellites are used routinely by the world community. The result has been a large measure of goodwill and support of our positions in the U.N. and other international fora."

It is in conformity with the international obligations of the United States.—For example, Article I of the Outer Space Treaty states, "the . . . use of outer space . . . shall be carried out for the benefit and in the interests of all countries irrespective of their degree of economic or scientific development and shall be the province of all mankind." Similarly, at the conclusion of the 1983 Williamsburg economic summit, the United States as a member of this summit agreed to a statement which said that "economic summit members support the need to assure timely public non-discriminatory data dissemination and to seek continued availability of satellite data".

It does not foreclose significant commercial opportunities.—Only one potential land remote-sensing bidder has testified that there is a commercial need for exclusive data rights. All other interested parties have testified that they could operate successfully under a policy of non-discriminatory access. Indeed, were the United States to adopt a policy of discriminatory access, a possible negative foreign reaction might close off a great many foreign markets, not only for data sales but for other space-related activities.

It protects value-added firms, the real developers of the market, from unfair practices by the system operator.—The data generated from satellites becomes truly valuable when it is operated on by trained analysts using advanced computers and thereby becomes economically valuable information. This is the kind of activity carried out in the "value-added" industry, whose products are, of course, highly proprietary. These are also the industries which will best be able to develop markets. They will seek potential users of the data and tailor information products to their use. Clearly, if this space technology is to be a commercial success, such firms must be protected and encouraged, and a non-discriminatory data access policy would guarantee that the value-added companies have

a ready supply of data. A particular danger could arise if a system operator set up his own value-added activity and attempted to discriminate against the other independent firms.

It is likely to facilitate foreign sales of both data and value-added services provided by the United States.—As alluded to above, if a foreign user can be confident that he is not being discriminated against, he is likely to be much more sympathetic to United States marketing efforts, not only in sale of information products derived from remote-sensing data, but also in negotiation of mineral exploration, development rights and other concessions that might be based in part on remote-sensing data.

It thus seems clear that the United States should continue its policy of non-discriminatory data access when space remote-sensing activities are commercialized. The Committee has drafted the legislation to reemphasize this policy forcibly, and to give it for the first time a statutory basis. Further, H.R. 5155 has been drafted to provide clear guidance to the Secretary of Commerce and to any system operator with respect to the commercial implications of a policy of non-discriminatory data access. Sections 104(3), 204(b), 402(b), and 601 of the bill comprise that policy.

It is the Committee's intent, while preventing discriminatory treatment of any potential data purchaser, to provide any system operator with certain flexibilities commonly available to commercial entities. Thus, a system operator would be permitted to offer volume discounts on data sales. Such discounts, however, may be "no greater than the demonstrable reductions in the costs of such sales" in order that small-scale users of remote-sensing data would not subsidize the larger customers for such data. The bill would also permit other flexibilities in the pricing structure, such as periodic "sales" from part or all of the data base, but again only to the extent that such pricing arrangements would be equally available to all potential customers.

It is also the Committee's intent to permit the system operator to vary the price of data in approximately inverse relation to the time of data delivery. Thus, it would be acceptable for a system operator perhaps to double the price of data delivered in one-half of the standard time so long as this early-delivery service and the later or standard delivery service were available to all potential customers.

The Committee would expect most system operators to retain the original data and to sell copies thereof. In this way, multiple copies of the same data could be sold if necessary to implement the non-discriminatory policy. A system operator is not prohibited from selling his original data (i.e., his only copy of a scene), but if such a policy were adopted, it would have to be implemented very carefully in order to make the data available on a non-discriminatory basis. For example, the system operator would have to decide what to do if two customers, before the data were taken, placed an order for the same scene. A simple first-come, first-served policy would discriminate in favor of more wealthy buyers, who could simply order every scene of an area and preclude others from obtaining the data.

The bill provides in section 601 that any system operator make "publicly available" the terms and conditions, including prices, under which he will sell data; section 104 provides that any offer

to sell or deliver data be "published in advance". It is the intent of the Committee in adopting these provisions to prevent any data purchaser from acquiring proprietary or de facto proprietary control over remote-sensing data. Since de facto proprietary control would result if only one potential data purchaser were aware of a particular service, the Committee intends that all sales policies or any change which a system operator may make with respect to sales policy should be generally advertised in the user community and also communicated promptly to any potential customer who asks to be informed of such changes.

In conjunction with existing law, the bill provides sufficient authority to agencies fo the Federal government t enforce the provisions pertaining to non-discriminatory data availability. Section 402 stipulates that non-discriminatory data availability is necessary for compliance with the licensing conditions established by the Secretary. The Secretary is authorized to revoke the license of, and to impose a civil penalty on, any system operator who fails to provide non-discriminatory data availability. With respect to international data sales, section 606(b)(3) authorizes the Secretary of State to report any instances outside the United States of non-discriminatory data access. The Committee intends that this reporting by the Secretary of State would enable the Secretary of Commerce to detect and correct foreign violations of the non-discriminatory policy.

During hearings which preceded the introduction and reporting of H.R. 5155, testimony was received from a number of witnesses representing the "value-added" land remote-sensing industry regarding the anti-competitive situation that could result from a systems operator competing, either directly or through a subsidiary, in the value-added market. The Committee shares this concern, particularly in light of the important role which the value-added industry plays in expanding and promoting the use of land remote-sensing data. In adopting section 402(b)(6), the Committee chose not to restrict commercial interest in land remote-sensing ventures by precluding a system operator from competing in the value-added market. That section does provide, however, that an operator can compete only after demonstrating to the Secretary that his commercial operation would not in any way violate non-discriminatory data availability. It is not the intent of the Committee to provide the Secretary with any new or additional authority with respect to regulation of potentially anti-competitive commercial activities. Rather, the Committee expects that the Secretary would monitor the business plans submitted to him under section 402(b)(7) and their subsequent implementation and would transmit these plans, and any suspected violation of non-discriminatory policy as he may detect, to the Department of Justice or to the Federal Trade Commission.

MARKETING OPPORTUNITIES WITH THE CURRENT LANDSAT SYSTEM (TITLE II)

A two-part consensus existed among many of the witnesses who testified before the Committee on the issue of how commercialization of land remote sensing should proceed:

1. The time necessary for full and viable commercialization of land remote sensing will be greatly accelerated by prompt transfer from the Federal government to the private sector of responsibility for marketing land remote-sensing data; and

2. Transfer to the private sector of the responsibility for non-marketing functions (i.e., operation of the ground segment, operation of the space segment, and ownership of the system) could proceed in phases.

Such testimony on "phased commercialization" significantly contributed to the drafting of the provisions of section 201. The Committee recognizes that, if the Secretary were not required to transfer Landsat marketing to the private sector, four years or more could elapse after the enactment of legislation before the private sector began to develop the remote-sensing data market. In light of the international competition that the United States can expect in land remote sensing (and particularly in light of the energetic marketing of the French SPOT system), the Committee believes it to be essential that the United States private sector begin as soon as practicable to gain marketing experience with land remote-sensing data.

The Committee feels that it would not be necessary (as reflected in section 203(b)(6)), that a single contractor win both the Title II and the Title III bids. In fact, there would likely be increased competition if there were two different contractors. The Committee feels that the goal of immediate marketing by the private sector is sufficiently important to override any inconvenience associated with awarding separate Title II and Title III contracts.

Section 201(b) specifies provisions under which the Title II contract shall br awarded (as section 302(b) specifies provisions for the Title III contract). In both of these cases, the Committee intends that such provisions are in addition to, rather than in lieu of, other acquisition regulations and authorities. The conditions for competition are designed to fulfill the intent of the bill to develop a healthy and dynamic market for remote-sensing data which will serve both the Title II and the Title III entity. The contractor selected pursuant to Title II must market aggressively and demonstrate the capability and commitment to effect a smooth transition with the contractor selector selected pursuant to Title III. Ultimately, the market so developed will also benefit any licnesee under Title IV, including the system operator of Title III.

OWNERSHIP AND SALE OF DATA

The Committee has carefully considered the question of ownership and sale of data, including those data provided to the Title VI archive. H.R. 5155 embodies the results of this consideration in four general precepts:

All systems operators must sell data on a non-discriminatory basis, as discussed above.

All systems operators must make data available to the archive at the cost of reproduction and transmission. This precept is more fully discussed below in the section on data archiving.

The United States would retain title to data generated by the existing Landsat system pursuant to the contract under Title II, which makes it clear that title to the entire Landsat system would remain with the United States government. The system operator, however, would market data from this system as the first phase of commercialization. Because the government retains title, the operator would actually have to sell copies of the original data.

Systems operators licensed under Title IV, including the system operator under Title III, would own the data that they generate and could market these data on any permissible non-discriminatory basis. Such a system operator would not be forbidden from selling original data (once a copy of it had been offered and made available to the archive), but if the original data were offered for sale, they must be sold in such a way as to meet the non-discriminatory criterion. Obvioiusly, this sort of practice would require considerable foresight on the part of the operator.

The following paragraphs describe how these principles are reflected in the provisions of the bill.

Ownership and Sale of Data Offered to the Federal Archive.—The relationship of the archive to the commercial activities of system operators is best explained by describing how the archive would function. It must be remembered that, while all data will be offered to the archive, the Secretary need not accept all of the data. He would only be required to maintain and update a basic global set. For those data that are maintained in the archive, the Secretary will establish a protective period not to exceed ten years in length, during which only the system operator can sell or distribute those data that he has provided to the archive. During this protective period, data in the archive would only be stored; they could not be distributed by the United States government. After the protective period, data in the archive could be made available to the public at the cost of reproduction and distribution. If pursuant to Section 602(e) a system operator wished to relinquish his exclusive right to sell particular data (perhaps because of the cost of maintaining the inventory), he could terminate the protective period for such data, which would then be available for distribution to the public from the archive.

The Committee expects that there will be three, or possibly four, classes of data in the archive governed by the provisions of H.R. 5155. The first class will be by far the largest, and can be considered typical. This class will consist of (i) data taken by the existing Landsat system after the effective date of the contract authorized by Section 201(a) and (ii) data taken by system operators licensed under Title IV, including the system operator selected pursuant to Title III. The system operator generating these data will enjoy a protected period not to exceed ten years, during which time (as discussed above) he will have an exclusive right to market the data. After the protective period, the data will be available from the archive.

The second class of data in the archive will be data taken by the existing Landsat system prior to the effective date of the contract of Section 201(a)—i.e., the "existing archive". The contractor select-

ed pursuant to Title II is given exclusive right to market these data on behalf of the government for the duration of his contract (the Committee intends that this contract be re-negotiated when the Landsat system is no longer generating useable data). The Committee recognizes that some of the data in the existing archive have already been sold or otherwise distributed. Thus, a user who, for example, bought a Landsat scene in 1980 cannot be prohibited from re-selling that scene to another user. Nevertheless, by virtue of his position as a central and reliable source, the system operator selected pursuant to Title II will undoubtedly find a market for data from this existing archive. After ten years or after termination of the contract, whichever comes first, the data would be available from the archive at the cost of duplication and distribution.

The third class of data in the archive would be experimental data. Although there is no requirement in the bill that these data be put into the archive, the Committee believes that some experimental data would have sufficient value to justify their inclusion. The Committee would certainly encourage those Federal agencies generating experimental data pursuant to Title V to make them available to the Secretary for archiving whenever appropriate. Experimental data could be made available from the archive for non-commercial research or monitoring purposes at any time for the cost of reproduction and transmission, but for commercial purposes only if in compliance with the provisions of Section 504 concerning the sale of experimental data.

There might be a fourth class of data in the archive: data purchased at commercial rates by the Secretary for use by the archive. For example, this class might include data available only from foreign sources. Or the Secretary might purchase data from a system operator for special use by the archive (providing that the non-discriminatory access criterion were observed). The Secretary would have to negotiate appropriate terms for such purchases.

Marketing of Data from Existing Landsat System.—The Title II contractor, pursuant to Section 201, will be entitled to the revenues he generates from sale of copies of Landsat data. The Committee intends that the contractor could give the Government a royalty on these sales, recognizes (in Section 202(b)) that the contractor could continue to sell data after the space segment of the existing system fails, and expects that there will be a large working inventory available for sale.

These concepts are further reflected in the selection criteria for the contract awarded pursuant to Title II, which include "ability to market aggressively" and "the best overall financial return to the government". From these criteria, it should be clear that the Committee's intent is that data from the system be marketed broadly and vigorously—that significant efforts be made to build a market and maintain it for as long as possible.

Marketing of Data from the Follow-on System Authorized in Title III.—Section 303 provides that there be a rebate to the Treasury (5 percent of the price of all sales of data to the Federal Government from the follow-on system) as partial compensation for the payment of Section 302(b)(4). The Committee realizes that this rebate will tend to make costs slightly higher for private sector users, but finds this consequence acceptable in light of the Government's role

in making the capability available for such users by the subsidy payment of Section 302(b)(4). Section 303(c) also recognizes that after the six-year period the contractor may continue in business and continue to market data with or without a space system in operation.

Non-Reproduction Rights in Section 603.—The language in this section is permissive—that is, a system operator may require that purchased data not be reproduced or disseminated by the purchaser. This language clearly does not substitute in any way for existing copyright law. The Committee takes no position on whether data from such space remote-sensing systems are subject to copyright. The Committee believes that a prudent system operator would realize that it would not be wise to insist on an absolute prohibition of reproduction. That is, he would probably maximize his market by allowing limited internal use, but not the kind of "black market" activities that would undercut a commercial operation.

THE TRANSITION PERIOD OF TITLE III

The Committee has heard consistent testimony on the importance of data continuity, but somewhat conflicting testimony over the adequacy of the present market to support a commercial land remote-sensing system. Because on balance most of the testimony pictured the present market as inadequate to support a commercially viable system, the Committee decided to take a cautious approach by providing limited Federal assistance during a finite transition period between government operation and private operation of these systems. Therefore, in Section 302, the Secretary is authorized to give limited financial support to the private operator providing the successor system to Landsat 5.

The transition period is defined operationally. That is, the Secretary is directed to purchase (by contract with a system operator) the capability of generating, selling, and delivering land remote-sensing data to the Federal Government for a period of six years. The specifications of quantity and quality of data, which together define what is meant by data continuity, are discussed at length in the two sections (The Definition of "MSS Data" and Data Continuity—TM versus MSS) following this section.

Under the terms of Section 302, the Secretary would pay for the "capability" of generating data (i.e., the availability of data) for the Federal Government. He would not actually purchase any data with the payment, although he certainly could purchase data from the system operator under the commercial conditions specified elsewhere in the bill. Nor would the Secretary buy or specify any particular hardware. The system operator selected pursuant to Title III would own all data and hardware, and would generate revenue by selling the data or copies of the data.

The Secretary's payment, as specified in Section 302(b)(4), would provide financial assistance to the system operator—in effect, a subsidy. The Secretary would pay this subsidy in order both to guarantee continuity of data from United States land remote-sensing systems and to enable the market to expand to commercial proportions. The Committee believes that such Federal assistance is necessary given the present uncertain market for land remote-sens-

ing data. By making the contract competitive, however, the Committee intends to minimize its price, and therefore, the amount of subsidy paid to the system operator.

The financial assistance provided is limited for six years to the operator's capital costs, but could not include his operational costs. The Committee felt that six years would be a sufficient time to determine the feasibility of commercial operation, especially given the two to three years of market development that will occur as data from the existing Landsat system are marketed by the private sector pursuant to Title II. Six years may not be long enough for the system operator to begin showing a profit; however, a profitable balance sheet may not be necessary to guarantee successful commercialization after the six-year period, so long as the trends are in the right direction. If a profit can be reasonably predicted based on sales trends, then the transition mechanism could be considered a success.

The Committee considered a variety of mechanisms beyond the direct payment specified in Section 302(b)(4) to encourage commercialization and development of a land remote-sensing data market. These mechanisms include loans or loan guarantees; guaranteed data purchases; tax benefits; or subsidized government services, such as launch services. The Committee rejected all of these mechanisms (save for the direct payment) for two reasons.

First, the Committee believes that the six-year period is in part an experiment to ascertain the potential size of the remote-sensing data market. At the end of the six-year period, it will be essential for the Congress, for the Administration, and for United States industry to have the clearest possible reading of the viability of what the Committee believes will be a burgeoning new industry. Free or in-kind services and special tax breaks would obscure that reading.

Secondly, certain mechanisms such as guaranteed Federal data purchases were prohibited because they could distort, or even shrink, the market. The Committee strongly believes that Federal agencies should purchase land remote-sensing data based on their real (i.e., unsubsidized) needs for such data. If guaranteed data purchases were permitted, agency users would look on the data as "free" and would value them accordingly. The Committee intends, by prohibiting guaranteed purchases, to encourage the system operator to market data to Federal agencies as he would to any other customer. Such a prohibition, then, should serve as a strong incentive to the development of a land remote-sensing data market.

Selection criteria for the contract awarded under Section 302(a) are given in Section 302(c) and reflect the Committee's view that the Secretary should balance several major factors in his evaluation of the bids. Among these are cost, technical competence, and the ability of the contractor to supplement basic capabilities (i.e., "MSS data") with more advanced technologies and services.

In order to encourage commercialization, the bill would require the Secretary to go through the procedures in Section 302(a) and to make a good-faith attempt to find a system operator able to meet the terms of the Act. However, should the Secretary fail to find such a system operator in the private sector or should he find that all persons offering to bid on the contract had submitted bids that would cost more than government costs, then Section 302(d) pro-

vides an escape mechanism. Under the provisions of this section, the Secretary may, after notifying the Congress of his failure to find a legitimate system operator, procure and operate a Federal land remote-sensing system. In adopting Section 302(d), the Committee intends neither to discourage commercialization of land remote sensing nor to indicate its lack of confidence in the ability of United States industry to respond successfully to the commercialization proposal. Rather the Committee is expressing its commitment to the maintenance of a United States presence in land remote sensing until such time as the United States private sector may successfully enter this growing international market.

THE DEFINITION OF "MSS DATA"

Section 301(b) of H.R. 5155 deals with the question of the quality of data to be generated by the commercial operator of Title III.

The quality of data specified is "MSS data", defined in section 301(b)(2) of the bill as "digital remote-sensing data which from the point of view of a data user are (A) functionally equivalent to data from the multi-spectral scanner; and (B) compatible with data and with equipment used to receive a process data from such scanner." Of course, this definition must be read in conjunction with the definition of "digital remote-sensing data" in Section 104(1) of the bill.

The Committee does not intend by this definition to require the contractor selected pursuant to Title III to fly the prototype multispectral scanner which has been carried on Landsats 1, 2, 3, 4, and 5. The Committee wishes to make clear that this instrument is named for purposes of data quality identification only, and that the definition does not specify this particular instrument. The definition is intended to specify that data of this quality constitute the minimal quality data necessary to satisfy the contract conditions.

Section 301(b)(2) uses the terminology "the point of view of a data user". This is crucial. Commercialization of land remote-sensing can only occur if the system design is market-driven—that is, determined by users' needs. A user probably does not care how the data were actually taken, so long as he knows what they mean, and so long as the data are accurate. Thus, the definition of "MSS" does not deal with sensor technology, but rather with making available data that are useful for those who depend upon such data. In the same sense, the terms "functionally equivalent" in section 301(b)(2)(A) and "compatible" in section 301(b)(2)(B) are to be understood as from the point of view of the user.

It is noteworthy that "MSS data" are "functionally equivalent to", but not "identical to" data from the multi-spectral scanner. In this as in other language, the Committee desired to leave certain flexibility. If the term "identical to" had been used, this might well have tied an operator to an older technology, which the Committee does not intend. "Identical to" could even have been interpreted to include the same kinds of optical distortions inherent in the scanning mirror systems, a prospect which the Committee clearly did not intend. The Committee also did not specify in its language that "MSS data" could be used interchangeably with data from the multi-spectral scanner. The language is only intended to indicate that such data have to be compatible with equipment that is used

for processing and analyzing multi-spectral scanner data. For example, a user should be able to use the same equipment to process "MSS data" allowing for a moderate amount of software modification. After such modified processing, a user should be able to compare and/or overlay "MSS data" with data taken from the multi-spectral scanner.

The Committee does anticipate that a commercially successful system operator would strive for a high degree of compatibility with existing uses of Landsat data. Thus, the Committee intends that "MSS data" would have a similar degree of information content as data from the multi-spectral scanner and that the data could be used for essentially the same applications. In speaking of a "user" of this data, the Committee is not contemplating a computer programmer who would be properly concerned with questions having to do with format and data rate, but rather with the end user, such as the geologist or hydrologist who needs to make decisions based on the information derived from the data. Such an end user should be able to use "MSS data" with minimal extrapolation and reprogramming of the techniques and algorithms used for data from the multi-spectral scanner of the present Landsat system.

The Committee expects that data of a higher quality than "MSS data" could be generated by a system operator who could then meet the legislative requirement for "MSS data" by some kind of electronic averaging or other manipulation of higher quality data. The system operator could thus with one instrument both develop new markets for the higher quality data and serve existing users. The Committee intends that the bill accommodate this approach.

DATA CONTINUITY—"TM" VERSUS "MSS"

During Committee hearings on the commercialization of land remote sensing, virtually every witness urged the maintenance of "data continuity". Of course, with the March, 1984 launch of the last United States government land remote-sensing satellite and with no follow-on Federal satellite program planned, a data gap may be inevitable. Such a gap is not itself an unsurmountable problem. In fact, a data gap of even several months would be tolerable if the users were assured of and could look forward to a secure supply of data in the future. Such certainty would allow users to amortize their current investments and plan for future programs, would allow value-added firms to develop new users, and would encourage market development. "Data continuity" thus does not necessarily mean the continual operation of a remote-sensing satellite. In fact, the Committee believes it possible that intermittent but regular operation of an appropriate sensor could, from the point of view of the user, constitute data continuity and, if so, would be an acceptable method of meeting the conditions of Title III.

Because of these considerations, the Committee has attempted to assure data continuity insofar as such assurance is consistent with its concurrent desire to commercialize space remote sensing. That is, commercialization necessarily involves a certain amount of risk; true commercialization would be impossible if all risk to the private sector (and to continuity) were removed. The Committee is

aware that it will take several years to build a private satellite to follow Landsat 5, a delay which may result in a data gap of some months, In light of this virtually inevitable gap, the Committee intended neither to encourage a crash program at extra expense in order to eliminate the data gap when Landsat 5 ceases operations, nor to provide so much subsidy for the private sector operator that there would be absolutely no risk that data would be interrupted. In this, as in several other provisions, the Committee is trying to strike a balance between the goal of assuring data continuity and the goal of true commercialization.

The Committee has attempted to promote data continuity by a variety of provisions and policies that permeate H.R. 5155. Title II of the bill would provide initial data continuity through continued operation of the existing Landsat system. In the period of transition towards commercial and fully private operation (Title III), government financial support is provided to increase the likelihood of data continuity. Finally, in the licensing provisions of Title IV and in the provisions of Title V mandating continued high-risk Federal R&D, the bill provides an encouraging governmental climate for data continuity—that is, for fully private operation after the transition period.

In drafting these provisions, the Committee recognized the need to define "data continuity" in an operational sense, at least during the transition period established pursuant to Title III. (After the transition period, when a fully private and commercial operation is underway, the market will decide what data are needed, eliminating the need for a legislative definition of data continuity.) Therefore, the Committee has addressed both the quantity and quality of data that should be provided during the transition period.

Data Quantity.—With regard to data quantity, the Committee decided to specify the amount of data purchased by the Federal Government during Fiscal Year 1983 as the minimum that should be made available by the system operator of Title III. The Committee has been assured in testimony from the Chairman of the Source Evaluation Board for Civil Remote-Sensing that this is indeed a reasonable minimum quantity and that any commercial operator would in fact want to make available much more data. The reason is evident: the 1983 level of Federal purchases is probably not enough to sustain a commercial system without very large price increases; in fact, initial commercial data sales would probably be much greater than this quantity. Since it would clearly be inappropriate to set a minimum level too high for a potentially successful commercial operator, and since the Federal Government will probably subsidize a portion of the capital costs of the system, the Committee decided to mandate only a quantity of data that would serve obvious Federal needs.

Data Quality.—The question of data quality is more complicated, and is considered from the perspective of technological innovation in the previous section (The Meaning of "MSS Data"). From the standpoint of continuity, it is noteworthy that MSS data have been available since 1972 and will continue to be available on Landsat 5 for several years. Some Thematic Mapper data were available from Landsat 4 and more will be available for the lifetime of the instrument on Landsat 5. It is important to emphasize here that the

Committee views "continuity" in the sense of data continuity rather than technological continuity.

The Committee parenthetically notes that when Landsat 4 and 5 were being designed, consideration was given to flying each mission with only the Thematic Mapper instrument abroad—that is, without the Multi-Spectral Scanner that had been on Landsats 1, 2, and 3. However, the system users voiced so much concern over this approach that ultimately the Multi-Spectral scanner was added to both Landsat 4 and Landsat 5.

The Committee notes that there has been some testimony related to the need by users for a higher quality data than MSS data, specifically the type of data that is generated by the Thematic Mapper instrument. However, the Committee further notes that at least some of those requesting such a level of data quality wish to have these data made available at government expense, an indication that a commercial market might not support such data. There is, of course, nothing in H.R. 5155 that would prevent a system operator from providing data of TM quality or of even higher quality. Indeed, section 302(c)(4) provides an incentive for delivering additional data of higher quality. However, because TM data have not been regularly available, and because the market for TM data has not been developed, it would not be reasonable to require a system operator to provide this higher quality (and therefore more expensive) data during the transition period. The bill provides every opportunity for the operator to provide higher quality data should the market demand such data. The Committee strongly feels that legislation should not mandate a specified level of technology, that this kind of decision should be left to the commercial operator, and ultimately to his or her perception of the market.

The Committee more particularly notes that many requesting data of Thematic Mapper quality represent oil or other mineral interests. In short, they seek geological information. Because the earth changes only slowly, a geologist typically does not need repeated "pictures" of an area (but he might need more than one scene to differentiate geological formations masked by seasonal vegetative changes). During the expected lifetime of the Thematic Mapper now flying on Landsat 5, enough data will be taken to provide about ten duplicate coverages of the entire land surface of the Earth. The point is that during its lifetime Landsat 5 is likely to obtain enough data on areas of geological interest to saturate the geological fraction of the market. Thus, were the Congress to require the higher quality TM data, it might be forcing the system operator to build a system whose market would have been substantially reduced by earlier government action.

The Committee also notes that Thematic Mapper data are considerably more expensive than "MSS data." For example, a "scene" of TM data demands seven computer tapes, while a "scene" of "MSS data" would only take one tape. Thus, if TM data were mandated, users would need more computing power.

Finally, the Committee realizes that the baseline level of data quality required by H.R. 5155 may not be the highest level of resolution currently available. However, the Committee encourages future commercial operators to utilize systems with improved technologies, such as a Thematic Mapper, when the market projections

for such data are sufficient to reasonably assure the commercial viability of data generated by the improved technology.

For all the reasons given, the Committee considered establishing a legislative requirement for TM data, but rejected such a requirement as anti-commercial.

GOVERNMENT REGULATION AND OVERSIGHT IN TITLE IV

Throughout H.R. 5155, provisions are outlined which obligate the system operator and the marketing entity to comply with certain requirements related to international commitments, non-discriminatory access to data, and national security issues. These requirements arose both from the necessity to honor major treaties, agreements, and conventions to which the United States is a signatory and from the Committee's views concerning market development and fair and equitable business and operating practices.

At present, no code of Federal regulations exists which would apply these requirements to private operators of remote-sensing systems, nor does any agency have specific statutory authority to promulgate and enforce such regulations. Therefore, Title IV of H.R. 5155 outlines the minimal regulatory and enforcement authorities for the Secretary of Commerce necessary to ensure that the policies and provisions of the bill are carried out.

The Government's control over private remote-sensing ventures will be based on two kinds of administrative action—licensing and regulation. First, in recognition of national security and international commitments and of the potential for each space system to be based on unique technical, operational and commercial concepts, the bill provides statutory criteria for the licensing of any space remote-sensing operator. The license would contain appropriate conditions and limitations applicable to that operation, a procedure permitting both great flexibility and great specificity in the Government's monitoring function. Other instruments of supervision such as registration, approvals, and certification would partially fulfill the administrative needs contained in the legislation but would not provide the necessary level of monitoring to ensure compliance, for example, with the Outer Space Treaty or with national security concerns.

The second kind of administrative action is provided by regulations to be promulgated by the Secretary for carrying out the licensing program under Title IV of the bill. These regulations are expected to establish additional normative requirements applicable to all licensed operations; prescribe procedures for the obtaining of a license and petitioning of changes thereof; and outline the enforcement authorities of the Secretary or his designated officers.

Adherence to the rulemaking requirements of the Administrative Procedures Act (Title 5, U.S.C.) requires that all actions that affect the public be carried out in a manner fully responsive to the views and rights of the public. In promulgating regulations under H.R. 5155, the Secretary is required to issue public notice and to solicit public comment. The Committee intends that the Secretary, in exercising his discretionary powers under this rulemaking process, be as responsive as is practicable to the public comment and that a clear record of regulatory decisions be made available in the

public domain. Although a more formal rulemaking process could have been required to guarantee that a more detailed record would exist, the Committee believes that the goals of commercialization and of data continuity are best served by a streamlined and timely regulatory framework.

Licensing activities will be carried out by the Secretary in accordance with Title IV and with the regulations developed under Section 404. Inasmuch as the issuance or disposition of a license will primarily affect the license applicant rather than the general public, no notice or comment is required in these cases except when an exemption, waiver or other form of relief from the regulations is sought. The Committee also recognizes that proprietary information that may be required as part of the license application may preclude meaningful application of notice-and-comment procedures.

The provisions of section 402 reflect the minimum licensing conditions deemed necessary to allow the Secretary to carry out his oversight responsibilities. These conditions include national security guidelines and international commitments presented by the Secretaries of Defense and State under Section 606; non-discriminatory access provisions under Section 601; data archiving agreements under section 602; and a special approval process should the operator wish to engage directly in commercial value-added activities. Section 403(b)(3) stipulates that licensing shall not contain conditions which are anticompetitive in nature. In particular, the license obtained by the contractor under Title III shall not contain any provisions which would disadvantage other license holders with regard to purchasing agreements, exclusive orbital or territorial rights, and other such arrangements.

The responsibilities of the Secretary and the rights of the licensee are further outlined in sections 403 (e) and (f). The right to petition for review is also extended to denial of issuance or transfer of a license. The licensee may request an agency hearing and formal adjudication by the Secretary. Any final actions will be subject to judicial review with the court empowered to dismiss such actions on appropriate legal grounds. Inasmuch as the form and venue of any proceedings for judicial review under the bill are not specified, the Committee intends that current practices for taking legal action should apply.

The enforcement authorities of the Secretary are intended to be the minimum necessary to monitor compliance, determine any wrongdoing, and impose appropriate penalties. In monitoring compliance, the Secretary under Section 405(a) may inspect records, space-related hardware, ground facilities, and any software. Section 405(b) specifies that it will be illegal either to violate any provision of the license or to inhibit enforcement or monitoring activities of the Secretary.

Section 405(c) specifies that any person actionable under any licensing provision or regulation may be assessed civil penalties of not more that $10,000 per violation. The Committee believes that civil rather than criminal penalties constitute an appropriate level of response for the type of violations envisioned.

In the event that the licensee's operation is deemed by the Secretary to be detrimental to the national interest, H.R. 5155 author-

izes the Secretary to invoke emergency powers under Section 405(f). In such cases, the Secretary may terminate any operation immediately.

Since the level of oversight activity likely to be experienced should not require a substantial workload on the part of the Government, the establishment of special regulatory and enforcement officers, bureaus, or administrations is not provided for in the bill. Nevertheless, the Secretary should take steps to facilitate the licensing procedure for potential applicants.

TITLE V AND THE NEED FOR A VIGOROUS FEDERAL R&D PROGRAM

General Provisions.—The Committee intends that commercialization of United States land remote-sensing systems should proceed in conjunction with a continuing and vigorous Federal program of research and development. The Nation needs such a program to remain preeminent in the field. The Committee envisions that the commercial use of space will become a major element in the United States economy and believes it vital that United States firms be provided with a continuing flow of technological innovations to remain competitive. The private sector traditionally does a fine job of marketing, but experience shows that for valid economic reasons it does not conduct research having a relatively long-term payoff.[4]

Accordingly, the Committee has written language to encourage a vigorous Federal R&D program. This general policy is embodied in section 501. The Committee intends that the program be broad in scope and that it include development of new technology, including sensors, communications, and spacecraft. The program should also include demonstrations of such new technologies. Finally, the program should include basic scientific work of two kinds. First, scientists in the classical disciplines must learn how to make better use of the kinds of data available today (e.g., to learn how to study geology or botany with Landsat 5 data). The second kind of basic science program involves looking for new kinds of science—that is, asking such questions as "What can we sense from space that we have not yet sensed?" or "What can we learn from such sensing?" These sorts of questions are not likely to be pursued by a commercial operator.

The Committee believes that the Federal program should include sponsored research at universities, so that professionals in various disciplines will be able to make use of remote sensing data in their work. There should also be applications research in those mission agencies that do not have space activities but that could use information from remote sensing. Examples are the Environmental Protection Agency, the Geological Survey, and the Department of Agriculture. Of course, the Committee also believes that such Federal activities should be well coordinated.

The Committee is aware of the path of development of electronics technology, in which research and development—including the exquisite accomplishments of the microminiaturization of comput-

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[4]The Committee would expect the private sector to carry on some research and development programs and not to rely totally on the Federal Government. Thus, the private sector would be expected to pursue research with a relatively short-term and certain payoff, such as improving products or developing marketable new applications.

ers—has served to drive down costs and expand usage far beyond what was anticipated when automatic computers were first introduced. The Committee is also aware that while space technology has made significant improvements in cost-effectiveness in areas such as telecommunications, the same kinds of revolutionary improvements have not occurred in all areas. If the Federal research effort in remote sensing is to be of maximal assistance to the commercial industry, a major fraction of its efforts must be put into programs aimed at improving the utility and cost-effectiveness of remote-sensing systems. It is of little use to develop technologies that generate useful information but which are too expensive to be practical for commercial use. Also, in some cases, the utility of remote-sensing systems can be most efficiently increased not by development of new space hardware, but by research on applications and by development of better data-processing systems on the ground. There needs to be a shift in the overall direction or thrust of Federal research and development efforts in this area. The Committee intends that the objective of the research efforts should be less on the development of technology and hardware as an end in itself and to a much greater degree justified in terms of improving the applicability and utility of remotely sensed data. The Committee does not intend by this direction to underestimate the importance of basic research or of long-term R&D. Rather, the Committee intends that the nature of the expected benefits should be closely examined to ensure that they go beyond the generation of elegant technology and focus on the improvement of remote-sensing applications.

Agency Roles.—Sec. 502(a) deals with NASA's role in remote-sensing R&D. The Committee's language does not add to NASA's existing broad authority, but reemphasizes it and makes it more specific. Taken together with the Committee's amendment to H.R. 5154, the National Aeronautics and Space Administration Act, 1985, which would add expansion of human knowledge "of the earth" to NASA's mission, H.R. 5155 gives NASA major statutory authority for remote sensing of the Earth. The Committee further intends that NASA conduct cooperative activities whenever such activities would result in more rapid or broader dissemination.

Sec. 502(b) provides that the Secretary shall conduct a strong remote-sensing research and development program with particular emphasis on applications of remote sensing. Of course, the Committee intends that such research and development be carried out through the National Oceanic and Atmospheric Administration. The Committee notes that NOAA has not conducted such a vigorous research program up to now.

In Section 502(c), the Committee indicates its intent that remote sensing be explored and its application expanded through applications research programs conducted by other Federal agencies.

Sec. 502(d) requires the Secretary and the Administrator of NASA to develop and report on a joint plan of research and development showing clearly how their respective missions are to be coordinated. The Committee does not intend to designate a lead agency either for the purpose of planning this research and development or for the purpose of preparing the report required in this section, since both agencies have legitimate research roles. It is the

intent of the Committee that this Act promote an integrated research plan so that areas of overlap and duplication are eliminated and areas in need are supplemented.

Experimental Data.—Because the experimental NASA Landsat program has run for more than 10 years and has involved five satellites, some private-sector firms have expressed a concern that future experimental government programs could inadvertently undercut commercial activities. Section 503 deals with this concern by limiting the use of experimental data programs—either Federally funded programs or those conducted in cooperation with Federal efforts. In other words, if NASA and another research institution were conducting a joint cooperative research program, that institution could use data from experimental government remote-sensing programs even though its efforts might not be Federally supported. Further, use of experimental data in such research programs need not necessarily meet the "non-discriminatory availability" requirements of the legislation.

Sale of Experimental Data. Section 503 prohibits the use of data from Federal experimental space remote-sensing programs for commercial purposes, or in competition with private-sector activities, with the important exception described below. The Committee realizes that experimental data might have commercial value (e.g., data from the Shuttle Imaging Radar may contain useful geological information). Faced both with the need to protect an emerging private remote-sensing industry and with the desirability of making the best use of experimental data, the Committee has attempted to strike a balance. Section 503 allows the use of experimental data in those research programs that have no market potential. On the other hand, if there is a demand for such data for commercial purposes, then under the provisions of Section 504, the data must be sold, en bloc "though a competitive process." The Committee does not intend that NASA or any other agency engage in selling experimental data bit-by-bit. Experience has shown that for experimental systems, the cost to the Government of searching and accessing specific data subsets can be substantial. The costs of administering the competitive process would also be great. For these reasons, all sales by the Government must be en bloc. All the data from one Shuttle or satellite flight could constitute one block, or if data from a longer-lived experimental satellite were found to have commercial value during the lifetime of that satellite, the entire body of data from that satellite, including rights to data not yet sensed, might form the block subject to competitive sale. The Committee intends that such situations be handled fairly but flexibly so as to maximize the accessibility of the data, realizing that each situation is likely to be different. The main purpose is to get such data out of the government and into the hands of a marketing entity.

The Committee intends for the en bloc sale of data by the Government to be carried out through a competitive process that avoids unrealistically low pricing by the Government, since such pricing could result in unfair competition with the private sector. The past policy of making such data available at a nominal fee would severely imbalance the market forces deemed necessary for a healthy commercial system. Of course, section 504 provides that

experimental data sold en bloc also be marketed subsequently on a non-discriminatory basis.

DATA ARCHIVING UNDER TITLE VI

A major public service responsibility of the Federal Government is to provide for long-term monitoring of the global environment, and land remote-sensing data constitute a major component of this effort. Since archiving entails maintenance of data likely to decline in commercial value over time, it is unreasonable to impose special maintenance requirements on the private operator or to expect the operator to perform such a service on his own accord.

Section 602 contains provisions which outline the Government's responsibility to provide an archiving service for land remote-sensing data. The substance of these provisions follows in large part the report of the National Commission on Libraries and Information Science, published in December, 1983. This report, entitled, To Preserve the Sense of Earth from Space, concludes:

> It is in the public interest to maintain an archive of land remote-sensing satellite data for historical, scientific and technical purposes;
>
> The data in question are a national resource worthy of preservation for the advancement of science and other applications, and while the cost of archiving these data is not insignificant, it is extremely small relative to the investment in the space segments of the satellite remote-sensing systems;
>
> It is in the public interest to control the content and scope of the archive and to assure the quality, integrity, and continuity of the data; and
>
> The maintenance of such an archive is, therefore, a responsibility that should be borne by the U.S. Government.

The central objective of section 602 is to give the Secretary of Commerce responsibility for maintaining a basic set of global scale remote-sensing data. The authority to collect such data is contained in section 602(b).

The definition and minimum content of the basic data set in 602(c) is largely discretionary on the part of the Secretary. However, it is the intent of the Committee that this set contain a representation of change in pertinent features (with portions thereof repeated at a frequency appropriate to the time scale). It is expected that portions of this representation will be repeated more often than others for significant changes of major ecological or environmental interest. It is also the intent of the Committee that data of different types and from different instruments be archived as they become available. Currently, all domestic data is archived at the EROS Data Center. By limiting the archive to a basic data set, the volume of data (and hence the maintenance expenses) will be kept reasonable. However, inasmuch as the archive is intended to contain non-domestic data as well as domestic data, some additional expenses may be incurred, particularly if the Secretary must purchase data from foreign ground stations or from foreign satellite operators to complete the whole earth representation.

Sections 602 (d), (e), and (f) outline the basic acquisition plan for archived data. Essentially, data must be surrendered by the private

sector to the Secretary upon request. It is the intent that this request be made in a timely fashion in order to preclude data being lost. The impact of this requirement on commercial operations is expected to be negligible since the operator will retain the exclusive right to sell the data (in accordance with sections 202 and 303) for a period set by the Secretary but not to exceed ten years, at which time the data in the archive become publicly available for the cost of reproduction and distribution. Section 602(f) also allows public access to begin prior to ten years if the operator terminates his offer to sell specific data. This might occur if, for example, the operator deems the commercial value of the data to be less than the cost of maintaining the data in his working inventory.

COMMERCIALIZATION OF WEATHER SATELLITES

In November 1983, the House adopted H. Con. Res. 168, as reported by the Committee, which expresses the sense of the Congress that it is "not appropriate at this time to transfer ownership or management" of civilian weather satellites to the private sector. In adopting Title VII of H.R. 5155, the Committee intends to prohibit future actions leading toward commercialization of weather satellites until such time as Title VII is repealed.

The Committee has strongly discouraged the proposal to commercialize weather satellites for several reasons, but principally because the proposal seems unlikely to result in a truly competitive and commercial situation. There is after all only one "buyer" for weather data—the Federal Government—which uses more than 95 percent of the data. Thus, there would in effect be no freedom of entry into the business if one firm won the contract for the government's data needs. Relative freedom of entry is an important determinant of any competitive business situation, and without competition, the contractor would have little incentive to improve his services.

Secondly, weather satellites are very important to national security, and therefore any system operator would have to agree to a great many conditions and limitations on his contract. These conditions and limitations would take from the contractor his ability to control his costs. The effect would be (as the Department of Commerce found when preparing a Request for Proposal) that the contract would likely have to be "cost plus". Thus, another aspect of a competitive commercial situation—price competition—would not be applicable.

In addition, the United States obtains a great deal of valuable information from other nations around the globe in return for our weather satellite data. Because the United States conducts both civil and military operations on a worldwide basis, worldwide data are essential both for forecasting and for calibrating satellite data against "ground truth". Therefore, United States satellite data must, for national security reasons, be freely exchanged globally, effectively precluding any international market for such data.

From the above, it seems clear that a contractor would have none of the incentives for efficiency and innovation that one normally associates with private sector, commercial operation. There

is no reason to expect improvement in operations under such circumstances.

The Committee is also concerned about the potential impact of "metsat" commercialization on public safety. Although weather satellites are not in the National Weather Service organizationally, they are certainly a key part of our Nation's weather forecasting system. The Committee believes that the driving principle of such a system should be service, not profit, a principle which argues against commercialization.

A final reason for keeping the satellites in the government is the increasing degree of international cooperation in this area. Other nations are beginning to pick up more of the burden of the global weather satellite system, which until now the United States has had to support nearly in toto. Such cooperation would undoubtedly cease if the United States Government were to unilaterally withdraw.

The Committee also notes that there is now a small but healthy private sector value-added meterological industry. Consulting meteorologists produce tailored forecasts for special industrial users; other firms take standard weather data and make them more presentable, understandable, and entertaining for use on commercial television broadcasts. These entrepreneurial activities should be encouraged, and there is no reason to believe that commercialization of weather satellites would do anything but threaten them with a loss of data.

In all of this, it is important to note that weather satellites transmit data to the ground through uncoded broadcasts. There is no extra cost to the government in allowing a user to put up an antenna to obtain data. (After all, it is a government service.) There would be extra costs, however, if the government had to add encryption or other controls to prevent such use.

The Committee further notes that Title VII does not in any way prohibit the Secretary from carrying out his responsibility to operate the weather satellites by means of contracts with private sector operators.

The Committee supports the fundamental concept of commercialization and looks forward to the innovation and efficiency that private sector involvement can achieve in space. In placing these restrictions on commercialization of weather satellites which can be removed by the same process which will emplace them, the Committee intends to avoid a repetition of the events of late-1983, when American industry was asked to expend its resources in responding to a request for proposals which included weather satellites and which therefore had very little chance of success.

In sum, the committee concurs with the view presented in a November 10, 1982 joint NASA/Department of Defense study (reports of the Ad Hoc Government Interagency Panels on Civil Operational Remote-Sensing Satellite Commercialization): "* * * there is considerable financial, policy, and program risk to the Government in commercializing weather satellites and there is no clear policy or financial benefit to be realized."

OTHER ISSUES

Foreign Ground Stations.—Early in its deliberations, the Committee became aware of the concerns of foreign users of land remote-sensing data regarding the prospect of dealing on a contractual level with a United States private-sector party. Indeed, the concept of active participation of a private-sector party in matters so closely related to diplomatic negotiations is not easily compatible with the culture and protocol of many foreign countries. Section 204 deals with this problem.

It is the intent of H.R. 5155 to effect a gradual transition between the present period of government-to-government relationships and the future situation in which the private sector will become a negotiating party. Presently, there are a number of agreements with foreign governments for the sale of data to their ground stations. These agreements contain provisions for immediate expiration should the Landsat system become privately owned. Foreign governments are concerned lest they be disadvantaged by the terms and services rendered under any new contracts with a profit-oriented private party. Generally, they feel that the investments they have made in hardware and training justify continuation of the contracts which have been negotiated with the United States Government over a long-term period.

It is the intent of H.R. 5155 to provide a measure of data continuity and to maintain the goodwill that has been developed through the government operation of the Landsat program. Inasmuch as the title to all portions of the Landsat system will be retained by the United States Government, Section 204(a) makes it clear that the Government will remain the party of primary responsibility in dealing with foreign governments until the expiration of the existing contracts. The entity selected pursuant to Section 201 will act as the agent of the U.S. Government in marketing data.

After the termination of existing contracts, the Committee does not intend for the Secretary to renew or enter into any further agreements. Pursuant to Section 204(b), new data marketing agreements may be entered into by the contractor, so long as such agreements provide for non-discriminatory marketing.

The benefits of this phased arrangement are twofold. First, the Government will have the opportunity to observe the performance of a private-sector party in dealing with foreign entities while it maintains substantial oversight responsibilities. Second, foreign governments will have the opportunity to become accustomed to dealing with a private-sector party while maintaining diplomatic relations with the owner and operator of the system (i.e., the United States government). Thus, the plan will provide both data continuity and ease of transition for foreign users.

Government Platforms for Private Systems.—Section 302(b)(7) and Section 406 provide for the use of Government satellites, or vehicles such as the Space Shuttle, as platforms for private remote-sensing activities. These provisions are meant to promote economic utilization of Government assets if such can be accomplished in a non-interfering manner. The Committee emphasizes that any use of Government platforms would not exempt the operator from the licensing provisions of Title IV.

In addition to the license, separate agreements would be required between the operator and the Government for use of the platform. H.R. 5155 requires that the private-sector party pay the costs of such utilization immediately (as opposed to payments as profits are realized). The Committee intends that the full costs of satellite upgrading or modification be borne by the private-sector operator. Additionally, the intended Government mission must not be compromised by the addition or operation of the remote-sensing payload.

Surplus Equipment.—Section 604(b) provides the Secretary with the authority to sell surplus equipment from the Landsat system to private-sector parties. This provision does not conflict with Section 201(c)(1), which prohibits the acquisition of Landsat equipment by the contractor of that section. The Committee intends that surplus equipment is that which is no longer of use to the Landsat system, as some equipment would be, for example, after the demise of the space segment of Landsat. Equipment which is integral to the active operation of Landsat or to continual marketing of data could not be defined as surplus. This provision is consistent with the Secretary's existing authority to dispose of surplus equipment and is meant to be clarifying in view of section 201(c)(1).

The Committee intends that the Secretary use his discretion to dispose of such surplus equipment in a manner that best promotes the commercialization of land remote sensing. That is, acquisition by a private-sector party representing an intent to engage in commercial land remote sensing would be preferred over disposal for some non-related purpose.

Radio Frequency Allocation.—Section 605 recognizes (i) that the Federal Communications Commission has jurisdiction over United States nongovernmental radio frequencies and that the Secretary, through the National Telecommunications and Information Administration, has responsibilities for Governmental radio frequency management; and (ii) that there is a hierarchy of priorities dictated by several national concerns which must be dealt with in managing radio frequencies. The purpose of the section is to point out the potential importance of commercial remote-sensing activities and to urge that they be given an appropriate priority when radio frequency allocations are requested.

National Security and International Obligations.—Section 606(a) and (b) outline the responsibilities of the Secretaries of State and Defense for identifying relevant international commitments and national security concerns and for communicating them to the Secretary of Commerce. These commitments and concerns must be taken into account in any licensing action of the Secretary.

In some cases, these concerns will necessitate that special limitations be imposed on the license. In determining relevant limitations, the Committee intends that the Secretaries of State and Defense exercise their discretion in a judicious manner and base their decisions on demonstrable adverse consequences which may result from some design or operational characteristic deemed to be undesirable. In order to avoid reimbursement costs from improper decisions, it is incumbent on the Secretaries of State and Defense to give timely and detailed consideration to each proposed operation.

National security requirements may include limitations on resolution or geographic restrictions set forth in advance. These should be uniformly applied without prejudice. The Committee does not intend that this discretion be used to screen data routinely or to impose any delays on the delivery of data to the marketplace.

International obligations may include treaties, conventions, and agreements to which the United States is a party or provisions of H.R. 5155 which affect international relations. In a larger sense, it is also appropriate to ensure that the activities of the private sector support other United States diplomatic interests to the extent practicable. Section 606(b)(3) contains language which encourages the Secretary of State to continue the use of land remote-sensing data as an instrument of foreign policy.

Reimbursement for Lost Revenues.—Section 606(c) provides for the reimbursement of a system operator by the Secretary of Defense or of State in the event that additional costs are incurred due to national security restrictions or international obligations. This reimbursement includes any additional operational costs or capital equipment items needed as a result of such requirements. In the case of unanticipated restrictions placed on the operator after approval has taken place through the licensing process, unrecovered past development costs may also be claimed. This pertains only to existing and approved space systems.

Department of Commerce Authority to Operate and Transfer Remote-Sensing Systems.—Under Section 201(a) of the National Aeronautics and Space Administration Authorization, 1983, (Public Law 97-324), the Secretary of Commerce's authority to operate and to plan for the transfer of civil land remote-sensing satellite systems expires on September 30, 1984. In adopting H.R. 5155, the Committee clearly intended that the Secretary's authority in this regard extend beyond fiscal year 1984, in order to enable the Secretary both to retain title to the Landsat system and to plan and provide for the follow-on system envisioned by Title III.

Therefore, Section 607 was drafted to amend Public Law 97-324 in order to provide the Secretary with standing authority to plan and provide for the management and operation of civil remote-sensing space systems. The Committee intends that this authority include not only civil land, but also civil oceanic remote-sensing space systems. The language in Section 607 does not indicate any lack of confidence by the Committee in the ability of United States industry to operate a viable commercial land remote-sensing system. It is, however, intended to be consistent with the "fall-back" authority provided to the Secretary in Section 201(d) and Section 302(d).

Authorization of Appropriations.—In order to provide initial funding for carrying out the procurement pursuant to Title III, for developing administrative procedures authorized in Title IV, and for establishing an archive pursuant to Section 602, section 609 specifies that $10,000,000 be authorized to be appropriated to the Secretary for fiscal year 1985. It is recognized that this sum may not be sufficient to accomplish the specified tasks during that fiscal year. It is intended that the Secretary take actions necessary to receive any additional budget authority which may be required by requesting supplemental appropriations from the appropriate Com-

mittees of Congress. This process will allow the true costs of the commercialization process to be assessed more accurately and will allow Congress to act accordingly.

VII. SECTIONAL SUMMARY OF THE BILL

TITLE I—DECLARATION OF FINDINGS, PURPOSES AND POLICIES

Sec. 101. Findings

(1) Data continuity is of major benefit for resource management and economic activities.
(2) United States leadership in remote sensing is in the national interest.
(3) Remote sensing involves international commitments and national security concerns.
(4) Non-discriminatory access to data will lead to the most beneficial use of data.
(5) Lack of data continuity and market development has inhibited the use of land remote-sensing data.
(6) The private sector is best suited for market development.
(7) A market-driven system will best achieve potential benefits of remote sensing technology.
(8) The process of commercialization should involve maximum competition and minimum subsidy.
(9) It is likely that the private sector alone will not develop a commercial land remote-sensing system.
(10) Government/private sector cooperation is beneficial.
(11) It is now appropriate to begin commercialization.
(12) Commercialization should involve minimum government direction and regulation.
(13) Government oversight will be required for national security and international commitments.
(14) Weather satellites should not be commercialized at this time.

Sec. 102. Purposes

(1) To provide guidance in commercialization.
(2) To preserve technological leadership, national security and international obligations.
(3) To ensure data continuity and non-discriminatory data access.
(4) To minimize Federal investment.
(5) To prohibit commercialization of weather satellites.

Sec. 103. Policies

(a) The United States has the right to acquire and disseminate remote-sensing data.
(b) The United States remains committed to non-discriminatory data access.
(c) Commercialization should retain and preserve governmental functions and national security and international obligations.

Sec. 104. Definitions

(1) "Digital remote-sensing data" means raw and pre-processed data.
(2) "Secretary" means Secretary of Commerce.

(3) A. "On a non-discriminatory basis" means without special preference which would favor one buyer over another.

B. Data may be sold only if (i) any offer is published in advance, (ii) no buyer is given favored access, (iii) volume discounts do not exceed demonstrable reductions in unit costs.

C. "On a non-discriminatory basis" does not require (i) identification of buyers, (ii) maintenance of a working inventory, or (iii) equal development of all market segments.

(4) "Landsat system" means Landsats 1 through 5, any follow-on satellites, and all accessory ground equipment, facilities and systems.

(5) "System operator" means the contractor selected pursuant to Section 201 or any license holder under Title IV.

Title II—Contract for Existing Land Remote-Sensing Satellite System

Sec. 201. Contract Requirements

(a) The Secretary shall contract with a United States private sector party for the marketing of Landsat data and, if appropriate, for the operation of the space and ground segments of the Landsat system.

(b) The contract shall be awarded competitively and may be reawarded after the demise of the Landsat satellite system.

(c) Such a contract shall not permit transfer of any equipment but may allow the contractor to maintain and repair the system.

(d) If no acceptable proposals are received, the Secretary must inform Congress and may reopen the competition after thirty days. If no acceptable proposals are received subsequently, the Secretary shall continue Landsat operation and data marketing.

(e) "U.S. private sector party" shall be defined by the Secretary.

Sec. 202. Sale of Data

(a) The Government shall retain title to all data from the existing Landsat system but the contractor shall be entitled to revenues from sale of copies.

(b) The contractor may sell data after the demise of the Landsat space segment.

Sec. 203. Conditions of Competition for Contract

(a) The Secretary shall publish international obligations, national security requirements, legal considerations and any other requirements.

(b) Contractor selection considerations include:

(1) marketing ability;

(2) best overall financial return to the Government;

(3) ability to meet requirements under subsection (a);

(4) technical competence;

(5) absence of conflicts-of-interest;

(6) ability to effect a smooth transition with the Title III contractor; and

(7) any other appropriate factors.

Sec. 204. Foreign Ground Stations

(a) The contractor shall honor existing international agreements to supply data.

(b) When such agreements expire or in the case of new agreements:

(1) the contractor shall have the exclusive right to market data from the Landsat system.

(2) data must be sold on a nondiscriminatory basis.

Title III—Provision of Data Continuity During Transition Period

Sec. 301. Purposes and Definition

(a) The purpose of this Title is:

(1) To provide for an orderly transition to a commercial system.

(2) To provide for data continuity for six years.

(b) Definitions:

(1) "Multi-Spectral Scanner;"

(2) "MSS data" means data which are:

(A) functionally equivalent to data from the multi-spectral scanner; and

(B) compatible with existing ground systems.

Sec. 302. Contract for Data Availability and Continuity

(a) The Secretary shall contract with a United States private sector party for the capability to generate data, at the 1983 Federal usage level, of at least MSS quality.

(b) The contract authorized in (a)—

(1) shall be entered into as soon as practicable;

(2) shall reasonably assure continuity for six years;

(3) shall terminate one year after the six-year period;

(4) may provide for a payment by the Secretary to cover a portion of capital costs;

(5) shall ensure that data sales are in accordance with Sec. 303;

(6) shall not guarantee data purchases;

(7) may provide for the use of Government satellites as platforms for private sensors if—

(A) the Government is immediately reimbursed;

(B) such usage does not interfere with the intended function;

(c) The contract authorized in Section 302(a) shall be awarded on the basis of—

(1) the cost to the Government;

(2) the contractor's reliability, competence and financial condition;

(3) his ability to develop the market;

(4) the additional data quality specified in 302(a);

(5) ability to meet Title IV licensing conditions;

(6) ability to provide data on a timely and reliable basis;

(7) ability to effect a smooth transition with the contractor selected pursuant to Title II;

(8) any type of rebate offer;
(9) any other appropriate factors.

(d) If no acceptable proposals are received the Secretary must inform Congress and, after thirty days, may reopen the competition. If again no acceptable proposals are received, or if the competition is not reopened, the Secretary must inform Congress and, after ninety days, may procure the necessary systems to assure data continuity.

Sec. 303. Sale of Data

(a) Data sales must be in accordance with Secs. 601 and 602.
(b) Data sales to the Government must involve at least a 5 percent rebate to the Treasury.
(c) After the six-year period, the contractor may continue to sell data and operate the satellite.

Sec. 304. Report.

Two years after the six-year period begins, the Secretary must report on the progress toward commercialization, including recommendations.

TITLE IV—LICENSING OF PRIVATE REMOTE-SENSING SPACE SYSTEMS

Sec. 401. General Authority

The Secretary is authorized to license private remote-sensing systems.

Sec. 402. Conditions for Operation

(a) A license is required for operation of a remote-sensing system.
(b) Any license issued will be subject to conditions to assure that:
(1) national security and international obligations are preserved;
(2) data is available on a non-discriminatory basis;
(3) such license shall not be a protection against competition;
(4) the President approves the disposition of a satellite if the operator terminates operations;
(5) the operator agrees to provide data to the Secretary for archiving;
(6) to ensure non-discriminatory practices, any operator—
(A) notifies the Secretary of any value-added activities; and
(B) provides a plan for such activities which ensures compliance with non-discriminatory requirements.

Sec. 403. Authority of the Secretary

(a) The Secretary is authorized to issue licenses.
(b) The license period shall be specified by the Secretary.
(c) Any private-sector party may apply for a license and in the application shall set forth activities to be carried out.
(d) The Secretary shall determine the ability of the applicant to meet national security and international commitments and to other requirements.
(e) The Secretary may revoke, suspend, or modify any license.

(f) Any petition for appeal shall be entitled to adjudication on the record. Final action by the Secretary is subject to judicial review.

Sec. 404. Regulatory Authority of the Secretary

(a) The Secretary may issue regulations.
(b) All regulatory action must involve public notice and comment (Section 553 of Title 5, U.S.C.).

Sec. 405. Enforcement Authority of the Secretary

(a) Any license shall require the licensee to allow:
(1) the Secretary to inspect records;
(2) the Secretary to inspect hardware or software system;
(b) Violations of license provisions, space treaties or laws, or interference with the Secretary's monitoring activities are unlawful.
(c) Civil penalties of not more than $10,000 per violation may be assessed.
(d) The Secretary has the power of subpoena.
(e) The Secretary may:
(1) seize objects, records, or reports;
(2) make investigations and take affidavits.
(f) The Secretary has emergency powers to terminate any licensed operation.

Sec. 406. Agency Roles

(a) A private-sector party may utilize a civilian United States Government satellite as a platform for a private remote-sensing mission.
(b) Any such party must—
(1) reimburse the Government immediately;
(2) not interfere with the intended Government mission.
(c) The Secretary may offer assistance in finding opportunities for such missions.
(d) Federal agencies may enter into such missions.
(e) This section does not apply to R&D ventures of Title V.

Sec. 407. Termination

The Secretary's authority under this Title expires five years after the six-year period if no operator has been licensed and continued in operation.

Title V—Research and Development

Sec. 501. Purpose and Policy

The purpose of this Title is to provide a civilian program of research, development, demonstration, application, and utilization of remote-sensing capabilities.

Sec. 502. Continued Federal Research and Development

(a)(1) NASA shall continue and enhance remote-sensing R&D.
(2) NASA shall—
(A) conduct experimental programs;
(B) develop technologies and monitoring techniques;
(C) conduct R&D with appropriate entities.
(b)(1) The Secretary shall continue—

(A) applications research;
(B) monitoring;
(C) technology development for monitoring;
(2) Such programs may include basic research at universities.
(3) The Secretary shall conduct R&D with appropriate entities.
(c) Other Federal agencies shall conduct appropriate R&D.
(d) NOAA and NASA shall jointly submit a biennial report which includes:
(1) a unified research plan for remote sensing;
(2) progress on ongoing research;
(3) an assessment of current knowledge, research needs, and opportunities for further progress.

Sec. 503. Use of Experimental Data

Experimental data may be used in Federally funded research but not for commercial purposes except as specified in Sec. 504.

Sec. 504. Sale of Experimental Data

Experimental data may be sold en bloc to any United States party who will market the data.

Title VI—General Provisions

Sec. 601. Non-discriminatory Data Availability

(a) All data shall be sold on a non-discriminatory basis.
(b) All terms and conditions of sale shall be made publicly available.

Sec. 602. Archiving of Data

(a) It is in the public interest for the Government:
(1) to archive data for monitoring purposes;
(2) to control the content of the archive;
(3) to assure the quality and continuity of the archive.
(b) The Secretary shall provide for and manage the archiving of a basic global data set.
(c) In determining the content of the basic data set, the Secretary shall—
(1) use currently archived MSS data;
(2) take into account future needs;
(3) seek advice from users and keep Congress informed;
(4) consider the need for seasonal, spectral, or other relevant coverage;
(5) include data from the title III contractor or any title IV license holder; and
(6) if appropriate, include data collected by foreign ground stations or space systems.
(d) The operator must make data available to the Secretary on request, for which the Secretary will pay reasonable costs.
(e) The operator has the exclusive right to sell data for a period not to exceed ten years or until such time as he terminates his offer to sell data.
(f) After the termination of the operator's exclusive right to sell data, such archived data shall be in the public domain and availa-

ble to requesting parties at the cost of reproduction and transmittal.

(g) The Secretary may use existing archive facilities or may contract for such operation.

Sec. 603. Nonreproduction

The operator may require that data not be reproduced by any data purchaser.

Sec. 604. Reimbursement for Assistance; Sale of Equipment

(a) NASA, DOD, and other agencies may assist operators if such assistance is reimbursed.

(b) The Secretary may allow the operator to buy portions of the Landsat system no longer needed.

Sec. 605. Radio Frequency Allocation

The Federal Communications Commission and the Secretary are encouraged to allocate radio frequencies for use by licensees.

Sec. 606. Consultation

(a) The Secretary of Defense shall determine conditions necessary to meet national security requirements and shall notify the Secretary.

(b)(1) The Secretary of State shall determine conditions necessary to meet international obligations and shall notify the Secretary.

(2) The Department of State is encouraged to utilize remote sensing in international aid programs.

(3) The Secretary of State shall report any instances of discriminatory data distribution outside the United States.

(c) If, as a result of national security or international obligations, additional costs are imposed on a licensed operator, the operator may recover such costs.

Sec. 607. Amendment to Title II of the NASA Authorization, 1983 (P.L. 97-324)

The Secretary is given standing authority to operate and to transfer to the private sector civil remote-sensing space systems.

Sec. 608. Relation to Other Laws

The requirements of this Act are in addition to other laws.

Sec. 609. Authorization of Appropriation

(a) $10,000,000 are authorized to the Secretary in Fiscal Year 1985 for carrying out this Act.

(b) This authorization is in addition to that provided pursuant to P.L. 97-324.

TITLE VII--PROHIBITION OF COMMERCIALIZATION OF WEATHER SATELLITES

Sec. 701. Prohibition

No portion of the weather satellite system may be commercialized.

Sec. 702. Future Considerations

This title must be repealed before any effort is made to commercialize weather satellites.

VIII. COMMITTEE VIEWS

The Use of Land Remote-Sensing Data in Interdisciplinary and International Cooperative Research Activities

The Committee has given much consideration to the non-commercial uses of land remote sensing for scientific purposes and for ecological and environmental monitoring. Although these uses represent a comparatively small utilization, they are nevertheless of crucial importance. Thus, the data archiving provisions of this bill are intended to preserve a record of changes related to landform and vegetation that can be used to establish causal relationships with climatic factors, levels of pollutants, solar variables, anthropogenic activities, and other natural phenomena.

In order to gain maximum use of land remote-sensing data, it is of great importance to integrate such data with other measurement data basis and research programs such that any causal relationships can be constructed. Such integration involves interdisciplinary research aimed at analyzing and quantifying interactions which occur at the interfaces between the atmosphere, the oceans, the land masses, and biological organisms. These interfaces often account for the major uncertainties in resolving technical and scientific problems and in defining options for remedial actions.

The International Geosphere Biosphere Program (IGBP), recently described by the National Academy of Sciences, offers the opportunity to develop greater cooperation between traditional scientific disciplines in building a framework which will focus on understanding the interactions between major systems. Patterned after the highly successful International Geophysical Year of 1957–58, IGBP emphasizes the need to achieve participation by other countries as well as by relevant Federal Agencies.

A major feature of H.R. 5155 is the emphasis given to the need for research in remote-sensing applications. The Committee has examined the research programs of the National Oceanic and Atmospheric Administration in the context of this new mandate and has concluded that these programs have the potential to make major contributions to IGBP. It will be crucial to draw upon NOAA's strength in formulating the scientific goals of IGBP and in defining the United States' role in the program. Resources spent by NOAA in these areas will achieve a substantially greater value if coordinated with an overall observation and research effort.

The Committee urges NOAA to cooperate with other agencies to support efforts to define IGBP's scope, objectives, and future plans. The Committee looks with anticipation to the international acceptance of either IGBP or a meaningful alternative framework within which resources can be focused.

IX. COST AND BUDGET DATA

In accordance with the requirements of Section 252(b) of the Legislative Reorganization Act of 1970, the Committee notes that this

bill contains an authorization for one year. The Committee further notes that the programs authorized in the bill may require, over the next five years, and increased authorization level above the fiscal year 1985 authorization of $10,000,000; the amount and timing of any such increases will depend upon findings and recommendations that result from the early stages of the land remote-sensing commercialization process.

The Committee believes, however, that the bill will result in a net decrease over the next five years in Federal expenditures for land remote sensing. The Committee estimates the current annualized cost of maintaining a Federal land remote-sensing system similar to the Landsat system to be in the range of $180 million. From the direction provided in the legislation and from the position taken by the Administration, it is clear that support for the follow-on private land remote-sensing system authorized by Title III will not exceed current Federal expenditures. Thus, there will be a net decrease in Federal expenditures for land remote sensing, even though the funding levels authorized pursuant to this legislation may increase above $10,000,000 in future fiscal years.

X. CONGRESSIONAL BUDGET ACT INFORMATION

The bill provides for new authorizations rather than new budget authority and consequently the provisions of Section 308 (a) of the Congressional Budget Act of 1974 are not applicable.

XI. CONGRESSIONAL BUDGET OFFICE COST ESTIMATE

U.S. CONGRESS,
CONGRESSIONAL BUDGET OFFICE,
Washington, D.C., April 2, 1984.

Hon. DON FUQUA,
Chairman, Committee on Science and Technology, U.S. House of Representatives, Washington, D.C.

DEAR MR. CHAIRMAN: The Congressional Budget Office has reviewed H.R. 5155, the Land Remote-Sensing Commercialization Act of 1984, as ordered reported by the House Committee on Science and Technology, March 27, 1984.

H.R. 5155 provides for the phased transfer of the federal government's civil land remote-sensing activities to the private sector while continuing to oversee their operation in order to preserve national security and certain other international interests of the United States. Transfer to a private party could relieve the federal government of both capital and operating costs associated with the Landsat system. On the other hand, the costs to federal agencies of acquiring remote-sensing data may be expected to increase upon privatization of land remote-sensing activities, and the transfer of such activities may involve a subsidy to the private sector party selected to provide remote-sensing capability. The net result could be either a savings or a cost to the federal government—but the consequences cannot be fully assessed until such time as a contractor has been selected and contract terms and conditions have been determined.

Titles II and III provide the mechanisms for transfer for the Landsat system to the private sector. Title II requires the Secretary of Commerce (subject to available appropriations) to enter into a contract with a private party to market the data generated by the existing Landsat system. The sale of the data is subject to certain restrictions and requirements, and the federal government retains title to all data generated by the system. If no proposals are found acceptable by the Secretary, he is required to continue operating the system and to market Landsat data.

Title III requires the Secretary of Commerce (subject to available appropriations) to contract with a private party to assume the capability of generating remote-sensing data of a specified minimum volume and quality and of making such data available to the federal government. The contractor must agree to assume responsibility for the system for a period of six years. The contract may provide for a payment to the contractor by the Secretary of a portion of the capital costs of providing remote-sensing capability. The payment, which may be made in installments, must be less than the total cost of procuring the system. The contract may not provide for any guarantee of federal purchases, and all sales to federal agencies are subject to a 5 percent rebate, up to the total amount of any subsidizing payments made to the contractor. If no bid is found to be acceptable, the Secretary of Commerce is authorized to ensure continued remote-sensing data availability by procuring and operating the necessary systems.

Title IV establishes the authority of the Secretary of Commerce to license operators of land remote-sensing systems. Title V directs the Administrator of the National Aeronautics and Space Administration and the Secretary of Commerce to continue and enhance remote-sensing research and development programs. Finally, Title VI requires the Secretary of Commerce to continue to archive land remote-sensing data.

Because the terms and conditions of the contract(s) to be entered into by the government, including the dollar amount of any subsidy to be provided to the contractor, have not yet been determined, the potential budget impact of H.R. 5155 cannot be estimated with any precision. The baseline for any such estimate is the continued operation by the federal government of the civil remote-sensing system. This could cost the federal government as much as $900 million between 1985 and 1989, assuming the need to purchase, launch and operate two additional Landsat D-type units over the period. Sale of data to nonfederal purchasers would partially offset these outlays. Currently, such sales are very small, accounting for only 25 percent of all Landsat data distribution in fiscal year 1983.

The cost of commercialization to the federal government is largely dependent upon the subsidy payments under Section 302 of the bill. The bill relies upon a competitive bidding process to produce the lowest possible subsidy, although there is no provision in the bill that would require the Secretary of Commerce to accept the bid with the lowest overall price. While bids have been received and reviewed by the Department of Commerce's Source Evaluation Board (SEB), these documents are proprietary and are not available for our inspection.

Conceivably, a private party might be able to take over and develop the land remote-sensing capability required by H.R. 5155 for less than it would cost the federal government to continue the Landsat program, if a "no-frills" system were developed. Indeed, at least one participant in the SEB's RFP process has indicated that it would be able to provide Landsat-type capability meeting all government requirements for approximately one-tenth of the cost of the current Landsat system. If such a proposal were accepted, little or no federal subsidy would be required and the total cost to the federal government would be reduced to the cost of purchasing remote-sensing data required by federal agencies, as well as some minimal expense for continued licensing and archiving activities. The net costs to the government under this arrangement would be less than under current law, although the savings cannot be estimated at this time.

On the other hand, it is possible that the subsidy cost will exceed the cost of continued federal Landsat operation. While the Secretary of Commerce is authorized to continue remote-sensing operations if he finds no bid acceptable under Title III, there is no requirement that a subsidy greater than the cost of federal operation be deemed unacceptable. Moreover, Section 302 of the bill requires only that the total of any subsidy payments be less than the total cost of procuring the system. The total cost of procurement by a private party may be greater than projected government costs, particularly if the privately-owned system is more sophisticated and expensive than the current one. The total cost to the government would also include the purchase of any remote-sensing data required by federal agencies, although this cost would be partially offset by the 5 percent rebate on federal purchases as required in Section 303. Thus, the federal government's subsidy and data costs could exceed the cost of continued federal operation, even before indirect impacts from possible tax credits to the contractor are considered.

Title VI of H.R. 5155 authorizes $10 million for appropriations in fiscal year 1985. This money is to be used for activities related to Titles IV and VI of the bill as well as for the payment of a first installment on any subsidy to be paid under Section 302. In the absence of any firm estimate of the subsidy that a private party might require to provide remote-sensing capability, it is impossible to determine the adequacy of this amount. It is estimated that most of the $10 million would be used for the subsidy payment, if one is required. In this case, CBO estimates that $0.7 million would be spent in fiscal year 1985 and $9.3 million in 1986.

In addition to the federal budget impact, it is possible that some additional costs would be incurred by state and local governments if the price of land remote-sensing data rises after the commercialization of Landsat. These governments are relatively small users of remote-sensing data, and their demand for Landsat products has historically been quite sensitive to price increases. Moreover, provisions in Section 603 of the bill that prohibit reproduction by any purchaser of remote-sensing data could increase costs for these users, which have traditionally relied upon sharing satellite data among themselves to reduce costs.

If you wish further details on this estimate, we will be pleased to provide them.

Sincerely,

RUDOLPH G. PENNER, *Director.*

XII. OVERSIGHT FINDINGS AND RECOMMENDATIONS, COMMITTEE ON GOVERNMENT OPERATIONS

No findings or recommendations on oversight activity pursuant to Rule X, clause 2(b)(2), and Rule XI, clause 2(1)(3)(D), of the Rules of the House of Representatives have been submitted by the Committee on Government Operations for inclusion in this report.

XIII. OVERSIGHT FINDINGS AND RECOMMENDATIONS, COMMITTEE ON SCIENCE AND TECHNOLOGY

No oversight findings and recommendations pursuant to Rule XI, clause 2(1)(3)(A), by the Committee on Science and Technology under the authority of Rule X, clause 2(b)(1) and clause (3)(f), of the Rules of the House of Representatives have been prepared since the convening of the 98th Congress.

XIV. EFFECT OF LEGISLATION ON INFLATION

In accordance with Rule XI, clause 2(1)(4), of the Rules of the House of Representatives, this legislation is assessed to have no adverse inflationary effect on prices and costs in the operation of the national economy.

In the long term, the Committee believes that the legislation will help to create a viable U.S. commercial presence in land remote sensing. A profitable space industry of this sort would, of course, act to mitigate inflation, not only by obviating the need for Federal expenditures, but also by creating both a source of tax revenues for the Federal Government and a commodity that U.S. industry could market internationally.

XV. CHANGES IN EXISTING LAW MADE BY THE BILL AS REPORTED

In compliance with clause 3 of rule XIII of the Rules of the House of Representatives, changes in existing law made by the bill, as reported, are shown as follows (existing law proposed to be omitted is enclosed in black brackets, new matter is printed in italics, existing law in which no change is proposed is shown in roman):

SECTION 201 OF THE NATIONAL AERONAUTICS AND SPACE ADMINISTRATION AUTHORIZATION, 1983

SEC. 201. [(a) The Secretary of Commerce is hereby authorized to plan and provide for the management and operation of a civil land remote-sensing satellite system, including the Landsat D and D' satellites and associated ground system equipment transferred from the National Aeronautics and Space Administration; to provide for user fees; and to plan for the transfer of the ownership and operation of civil operational land remote sensing satellite systems by the private sector when in the national interest. The provisions of this subsection expire September 30, 1984.] *(a) The Secretary of*

Commerce is hereby authorized to plan and provide for the management and operation of civil remote-sensing space systems, which may include the Landsat 4 and 5 satellites and associated ground system equipment transferred from the National Aeronautics and Space Administration; to provide for user fees; and to plan for the transfer of the ownership and operation of civil, operational remote-sensing space systems to the private sector when in the national interest.

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XVI. AGENCY RECOMMENDATIONS

On February 13, 1984, letters were sent to several Federal agencies (Department of Agriculture, Department of Commerce, Department of Defense, Department of the Interior, Department of Justice, Department of State, and the National Aeronautics and Space Administration) soliciting comments on H.R. 4836, the predecessor to H.R. 5155. However, no response to these letters had been received at the time that H.R. 5155 was reported.

XVII. COMMITTEE RECOMMENDATION

The Committee favorably reported the bill H.R. 5155 by voice vote, a quorum being present, and recommends its enactment.

XVIII. ADDITIONAL VIEWS

Disagreement with the Prohibition of Commercialization of Weather Satellites.—The space program has been one of the most successful and popular programs in our history. One of the most visible results of NASA's outstanding achievements in space is the greatly increased ability to forecast the weather from a global perspective.

I disagree with the language of the bill which prohibits the commercialization of weather satellites. It may well be in the national interest even at this time to commercialize weather satellites. Certainly, this option will become more feasible with the passing of time. The option to transfer the weather satellites to the private sector for commercialization should be left open rather than prohibiting that consideration based on our limited perspective at this time.

BOB WALKER.

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